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09/772,664	01/30/2001	Kazuhito Ohashi	1232-4676	2213

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EXAMINER	
THOMPSON, JAMES A	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	09/772,664	OHASHI, KAZUHITO
	Examiner	Art Unit
	James A. Thompson	2625

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 April 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *37-40 and 48-61* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 December 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, filed 09 April 2007, with respect to the prior art rejections of the claims under 35 USC §103(a) have been fully considered and are persuasive. The present amendments to the claims do overcome the combination of references set forth in the previous office action mailed 08 December 2006. Therefore, the prior art rejections have been withdrawn. However, upon further consideration, new grounds of rejection are made in view of newly discovered prior art, which has been applied to form a new combination of references, as set forth in the prior art rejections below. Since the new grounds of rejection are necessitated by the present amendments to the claims, the present office action is made final.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 37-40, 48-55, 57-58 and 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arimoto (US Patent 5,371,613), Orito (US Patent 6,072,912), Holub (US Patent 6,043,909), and Irie (US Patent 5,644,409).

Regarding claim 37: Arimoto discloses an image sensing apparatus (figure 2 of Arimoto). Figure 1 and figure 3 of Arimoto show further details of said apparatus (column 3, lines 3-5 and lines 8-10 of Arimoto).

Arimoto further discloses an image sensor (figure 1(210) of Arimoto) which reads out image signals (column 4, lines 56-58 of Arimoto) from a plurality of photoreceptive pixels (CCD) via an output channel (column 4, lines 53-56 of Arimoto); a memory (figure 1(110) of Arimoto) for temporarily storing the image signals output from the output channels (column 5, lines 20-52 of Arimoto); a reference level acquisition unit (figure 1(106(portion)) of Arimoto) adapted to acquire a first reference level (Bd1) based on the image signals read from said memory when said image sensor reads a white member (column 6, lines 44-49 of Arimoto), and acquire a second reference level (Pave) based on the image signal read from

said memory when said image sensor reads a reference density member having a predetermined density of halftone (column 6, lines 26-34 and column 7, lines 8-12 of Arimoto); an adjustment setting unit (figure 1(106(portion)) of Arimoto) for setting adjustment data for each channel based on the acquired first and second reference levels (column 7, lines 28-36 and column 9, lines 41-51 of Arimoto); and an adjustment unit (figure 1(106(portion)) of Arimoto) adapted to adjust levels of the image signals output from said output channel according to the set adjustment data for each channel (column 9, lines 41-57 of Arimoto) so as to substantially correspond with said first reference level when said image sensor reads said white member (column 7, lines 48-55 of Arimoto), and adjust levels of the image output from said output channel according to the set adjustment data for each channel (column 9, lines 41-57 of Arimoto) so as to substantially correspond with said second reference level when said image sensor reads said reference density member (column 9, lines 52-56 and column 10, lines 1-4 of Arimoto).

Arimoto further discloses that the signal level value for said second reference member (figure 3 (301P) of Arimoto) is uniform and unchanging over the area of said reference member (column 6, lines 38-43 of Arimoto). Therefore, said second reference level is a minimum of signal levels read out when said reference density member is scanned, since said minimum is equal to said uniform signal level value.

The reference level acquisition unit, adjustment setting unit, and adjustment unit each correspond to the portion of the physically embodied computer routines that causes the computer to perform the functions of said reference level acquisition unit and said adjustment unit.

Arimoto does not disclose expressly that said image sensor separately reads out image signals from a plurality of photo-receptive pixels via a plurality of output channels; and that there are a plurality of adjustment units, respectively corresponding to said plurality of output channels, each of which separately perform the functions of said adjustment unit taught by Arimoto, the plurality of adjustment units operating to match the linearity of the plurality of channels to a common linearity. Since two separate reference levels are used by said adjusting unit to adjust the image data, it would be reasonable to assume that said adjustment unit adjust levels of the image signals output from said output channel so as to substantially correspond with a level obtained by interpolating between said first and said second reference levels when said image sensor reads an image having a density other than the density of said white member and said reference density member. However, Arimoto does not disclose expressly that said adjustment unit adjust levels of the image signals output from said output channel so as to substantially correspond with a level obtained by interpolating between said first and said second reference levels when said image sensor reads an image having a density other than the density of said white member and said reference density member, wherein said first level is a maximum of signal levels

read out via the plurality of output channels when said white member is scanned, and said second reference level is a minimum of signal levels read out via the plurality of output channels when said reference density member is scanned.

Orito discloses separately outputting image signals of a plurality of photoreceptive pixels via a plurality of output channels (column 5, lines 9-14 of Orito). By transferring the image data in parallel (column 5, lines 9-14 of Orito), a plurality of output channels are used to separately output image signal of the plurality of photoreceptive pixels.

Orito further discloses a plurality of adjustment units, respectively corresponding to said plurality of output channels, each adapted to adjust levels of the image signals output from said output channels (column 6, lines 20-26 of Orito). Tone levels are adjusted to produce tone data, black level data, and white level data, which are output separately.

Arimoto and Orito are combinable because they are from the same field of endeavor, namely correcting digital tone data in digital image scanners. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to process and adjust the image data based on said reference member, as taught by Arimoto, using parallel data transfer and to adjust said tone data using a plurality of adjustment units respectively corresponding to the output units used for the parallel data transfer, as taught by Orito. Therefore, there would be a plurality of output terminals accessed by said reference level acquisition unit and said adjustment unit, and said second reference level would be read out via the plurality of output channels. The suggestion for doing so would have been that parallel data transfer is a standard form of communication interface (column 5, lines 8-14 of Orito). Therefore, it would have been obvious to combine Orito with Arimoto.

The combination of Arimoto and Orito does not disclose expressly that said adjustment unit adjust levels of the image signals output from said output channel so as to substantially correspond with a level obtained by interpolating between said first and said second reference levels when said image sensor reads an image having a density other than the density of said white member and said reference density member, the plurality of adjustment units operating to match the linearity of the plurality of channels to a common linearity, wherein said first level is a maximum of signal levels read out via the plurality of output channels when said white member is scanned.

Holub discloses using interpolation to determine image data values that are not located at a sample point (column 20, lines 1-14 of Holub); and that the linearity of the plurality of channels are matched to a common linearity (column 20, lines 10-19 of Holub – *plurality of color channels gamut scaled so as to be converted to Uniform Color Space, such as CIELab*).

The combination of Arimoto and Orito is combinable with Holub because they are from the same field of endeavor, namely digital image data processing and correction. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use interpolation and gamut scaling of the separate channels to convert to a Uniform Color Space, as taught by Holub, said interpolation being performed by said adjustment data acquisition unit to match said levels that are between said first and second predetermined levels, and said gamut scaling being performed by the plurality of adjustment units. The motivation for doing so would have been to improve the reproduction characteristics of the resultant output image data. Therefore, it would have been obvious to combine Holub with the combination of Arimoto and Orito.

The combination of Arimoto, Orito and Holub does not disclose expressly that said first level is a maximum of signal levels read out via the plurality of output channels when said white member is scanned.

Irie discloses using the maximum (WMAX2) of the obtained signal levels (column 7, lines 26-30 of Irie) for performing white level correction (column 8, lines 22-25 of Irie).

The combination of Arimoto, Orito and Holub is combinable with Irie because they are from the same field of endeavor, namely digital image data correction. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the maximum of the obtained signal levels, as taught by Irie, said signal level read out via the plurality of output channels taught by the combination of Arimoto and Orito. The motivation for doing so would have been to be able to perform white level correction for a case when the white member is not dirty as a whole, but partially dirty (column 8, lines 23-25 of Irie). Therefore, it would have been obvious to combine Irie with the combination of Arimoto, Orito and Holub to obtain the invention as specified in claim 37.

Regarding claim 38: Arimoto discloses that said reference density member (figure 3(301P) of Arimoto) is provided within the image sensing apparatus (column 6, lines 22-26 of Arimoto).

Regarding claim 39: Arimoto discloses a platen (figure 3(15) of Arimoto) for placing an original to be read (column 5, lines 40-43 of Arimoto), wherein said image sensor reads said reference density member (column 6, lines 41-43 of Arimoto) in a case where said reference density member is placed on said platen (column 6, lines 26-30 of Arimoto).

Regarding claim 40: Arimoto discloses that at least one of the first and second reference levels is set in advance (column 6, lines 26-31 of Arimoto). The reference patch (figure 3(301P) of Arimoto) is set to a predetermined level (0.1) (column 6, lines 26-31 of Arimoto) and used as a reference level for the shading correction (column 6, lines 42-43 of Arimoto).

Regarding claim 48: Arimoto discloses that said adjustment units adjust maximum levels of image signals so that they become maximum levels after adjustment (column 10, lines 5-10 of Arimoto). After said adjustment by said adjustment units (column 9, lines 52-56 and column 10, lines 1-4 of Arimoto), the output pixel values that are set to 255 (the maximum value for eight bits) based on the normalization with respect to the standard white plate density measurement (column 10, lines 5-10 of Arimoto).

Regarding claim 49: The combination of Arimoto and Orito does not disclose expressly that the levels between said first and second reference levels are interpolated by a straight line.

Holub discloses using interpolation to determine image data values that are not located at a sample point, said interpolation being linear interpolation (column 20, lines 1-14 of Holub), and thus interpolation by a straight line.

The combination of Arimoto and Orito is combinable with Holub because they are from the same field of endeavor, namely image data processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to specifically use linear interpolation to interpolate image data values when said image data is between predetermined points, as taught by Holub. The motivation for doing so would have been to improve the reproduction characteristics of the resultant output image data. Therefore, it would have been obvious to combine Holub with the combination of Arimoto and Orito to obtain the invention as specified in claim 49.

Regarding claim 50: The combination of Arimoto and Orito does not disclose expressly that the levels between said first and second predetermined levels are interpolated by a curve.

Holub discloses using interpolation to determine image data values that are not located at a sample point, said interpolation being performed using a curve (column 20, lines 4-6 and lines 29-38 of Holub – *interpolation can be used in lieu of LUTs for compensation functions [column 20, lines 4-6 of Holub]*).

The combination of Arimoto and Orito is combinable with Holub because they are from the same field of endeavor, namely image data processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use curve interpolation to interpolate image data values when said image data is between predetermined points, as taught by Holub. The motivation for doing so would have been to improve the reproduction characteristics of the resultant output image data. Therefore, it would have been obvious to combine Holub with the combination of Arimoto and Orito to obtain the invention as specified in claim 50.

Regarding claim 51: The combination of Arimoto and Orito does not disclose expressly that interpolation is performed by operation.

Holub discloses using interpolation to determine image data values that are not located at a sample point (column 20, lines 1-14 of Holub), said interpolation being performed by operations, such as linear interpolation operations (column 20, lines 4-7 of Holub) and curve interpolation operations (column 20, lines 4-6 and lines 29-38 of Holub – *interpolation can be used in lieu of LUTs for compensation functions [column 20, lines 4-6 of Holub]*).

The combination of Arimoto and Orito is combinable with Holub because they are from the same field of endeavor, namely image data processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to perform the interpolation using operations, as taught by Holub. The motivation for doing so would have been to improve the reproduction characteristics of the resultant output image data. Therefore, it would have been obvious to combine Holub with the combination of Arimoto and Orito to obtain the invention as specified in claim 51.

Regarding claim 52: Arimoto discloses that said adjustment data is in a form of a look up table (figure 1(112') and column 60-67 of Arimoto).

Further regarding claim 53: Orito discloses separately outputting image signals of a plurality of photoreceptive pixels from a plurality of output channels (column 5, lines 9-14 of Orito). Since the image data is transferred in parallel (column 5, lines 9-14 of Orito), there are a plurality of output channels used to separately output image signal of the plurality of photoreceptive pixels. A plurality of output channels is clearly at least two output channels, therefore said plurality of output channels comprises a first output channel and a second output channel. Since there is no particular order to the output of the photoreceptive pixels, then both said first output channel and said second output channel would each output even-numbered photoreceptive pixels, though said first output channel and said second output channel would also output odd-numbered photoreceptive pixels. Thus, said plurality of output channels comprises a first output channel which outputs image signals of even-numbered photoreceptive pixels, and a second output channel which outputs image signals of even-numbered photoreceptive pixels.

Regarding claim 54: Arimoto discloses that said image sensor is a linear image sensor (column 4, lines 53-56 of Arimoto).

Regarding claim 55: Arimoto discloses that a plurality of said linear image sensors respectively corresponding to a plurality of colors are provided to form a color image sensor (column 19, line 65 to column 20, line 1 of Arimoto).

Regarding claim 56: The combination of Arimoto, Orito and Holub does not disclose expressly that said image sensor is an area image sensor.

Irie discloses an area image sensor (figure 1(1) and column 5, lines 29-32 of Irie).

The combination of Arimoto, Orito and Holub is combinable with Irie because they are from the same field of endeavor, namely digital image data correction. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use an area image sensor, as taught by Irie, for the image sensor taught by Arimoto. The motivation for doing so would have been to be able to read data two-dimensionally (column 5, lines 31-32 of Irie). Therefore, it would have been obvious to combine Irie with the combination of Arimoto, Orito and Holub to obtain the invention as specified in claim 56.

Regarding claim 57: Arimoto discloses that each of said plurality of adjustment units includes an amplifier (figure 1(101) of Arimoto) for amplifying the image signal output from the corresponding output channel (column 5, lines 1-2 of Arimoto).

Regarding claim 58: Arimoto discloses an A/D converter (figure 1(102) of Arimoto) adapted to convert the image signal output from each of the output channels from an analog signal to a digital signal (column 5, lines 2-3 of Arimoto).

Since the combination of Arimoto and Orito teaches a plurality of output channels, as discussed in the arguments regarding claim 37, the combination of Arimoto and Orito therefore teaches a plurality of A/D converters, each adapted to convert the image signal output from each output channel from an analog to a digital signal. Since there are multiple output channels, multiple A/D converters are required, one for each output channel.

Regarding claim 60: Arimoto discloses that said reference density member has at least a portion of uniform density (column 6, lines 37-43 of Arimoto).

4. Claims 59 and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arimoto (US Patent 5,371,613), Orito (US Patent 6,072,912), Holub (US Patent 6,043,909), Irie (US Patent 5,644,409), and Usami (US Patent 5,960,110).

Regarding claim 59: The combination of Arimoto, Orito, Holub and Irie does not disclose expressly that the image sensing apparatus is connected to a printer and said reference density member is printed on said printer.

Usami discloses that the image sensing apparatus is connected to a printer (figure 5(20) and column 7, lines 28-30 of Usami) and a reference output condition, e.g. reference printing density, is printed (column 7, lines 40-43 of Usami).

The combination of Arimoto, Orito, Holub and Irie is combinable with Usami because they are from the same field of endeavor, namely scanned digital tone data correction. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to connect said image sensing apparatus to a printer and print out a reference density, as taught by Usami, said reference density being the density of said reference density member taught by Arimoto. The motivation for doing so would have been to generate predictions for the corrected output conditions (column 7, lines 47-50 of Usami). Therefore, it would have been obvious to combine Usami with the combination of Arimoto, Orito, Holub and Irie to obtain the invention as specified in claim 59.

Further regarding claim 61: Usami discloses that an image sensing apparatus (figure 5 and column 7, lines 20-23 of Usami) is integrally configured with said printer (figure 5(20) of Usami), since said printer is used to generate the reference images based on the apparatus output conditions (column 7, lines 28-33 of Usami).

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Thompson whose telephone number is 571-272-7441. The examiner can normally be reached on 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K. Moore can be reached on 571-272-7437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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04 June 2007

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